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Authors of papers intended for publication in FOOD TECHNOLOGY should request from the Editor's office a copy of a booklet, tittled "Suggestions to Authors," and see that their papers are in the form specified therein before they are sent to the editor.

The Institute of Food Technologists assumes no responsibility for statements in contributed articles appearing in FOOD TECHNOLOGY. Editorials present only opinions of the writers and do not necessarily reflect policies of the Institute of Food Technologists.

Abstracts

(Continued from page 4)

226J. Physiological properties of sodium carboxymethyl starch.
WANG, C. C., GROSSMAN, M. I., AND IVY, A. C. *J. Nutr., 40,* 471-81 (1950).

Carboxymethyl starch of a high degree of substitution causes diarrhea when fed to rats in a concentration as low as 5% of the diet and when fed to humans at an average level of 60 grams per day. High concentrations of this material in the diet of rats (45% of the diet by wt.) cause death within one week. Carboxy-methyl starch of a low degree of substitution produces a milder diarrheal reaction. Carboxymethylamylose produces diarrhea more readily than does carboxymethylamylopectin.

227J. A note on the relative rates of reaction of several reducing sugars and sugar derivatives with casein.
LEWIS, V. M., AND LEA, C. H. *Biochim. Biophys. Acta. 4,* 532-4 (1950).

The rates of loss of free amino-N and of browning in mixtures of casein with various reducing sugars at pH 6.3, 70% relative humidity and 25 or 37° C. have been studied. The pentoses, xylose and arabinose reacted most rapidly with the protein amino groups, followed by glucose, galacturonic acid, lactose, maltose, and gluronic acid. Fructose reacted extremely slowly. Browning was most rapid with glucuronic acid, followed by the pentoses, galacturonic acid and glucose. Lactose, maltose and fructose produced no discoloration within the period of the experiments.

MICROBIOLOGY

228J. Quaternary ammonium compounds as sterilizing agents for bacterial spores.
CURRAN, H. R., AND EVANS, F. R. *J. Dairy Sci., 33,* 1-15 (1950).

Eight quaternary ammonium compounds and 2 quaternary-containing detergents were studied in respect to their spore-killing activity in buffer or distilled water solutions. Sporocidal activity increased with temperatures at 30, 60, 80, and 95° C., and with increased alkalinity at pH 6.4, 8.0 and 9.6. Traces of skim milk films decreased sporocidal activity. At 95° C. and pH 9.6 and at a concentration of 1-20, the quarternaries did not kill all of the spores in 30 minutes.

NUTRITION

229J. Studies of the nutritive impairment of proteins heated with carbohydrates. II. In vitro digestion studies.
LOWRY, J. R., AND THIESSEN, R. JR. *Arch. Biochem., 25,* 148-56 (1950).

The autoclaving of moist casein or wheat gluten with dextrose has been shown to give rise to a protein-sugar complex that is digested *in vitro* by pepsin, chymotrypsin and pancreatin, but is resistant to the action of trypsin and papain. It is suggested that the reaction of the sugar with the protein blocks the necessary groups and tryptic activity is no longer possible in the modified protein.

230J. The effect of mineral oil on food utilization. I. Caloric value of food.
PAUL, H. E., AND PAUL, M. F. *Am. J. Digest. Dis. 17,* 55-7, Feb., 1950.

Food consumption and fecal weight records on white rats indicate no caloric loss of food is experienced with the ingestion of mineral oil, and increase in fecal weight from animals receiving mineral oil could be accounted for by weight of mineral oil fed. Levels fed to rats were comparable to described dosage for relief of constipation in humans.

231J. The relation of the amino acid-sugar reaction to the nutritive value of protein hydrolysates.
FRIEDMAN, L., AND KLINE, O. L. *J. Nutr., 40,* 295-307 (1950).

In the presence of glucose, the nutritive quality of protein hydrolysate solutions deteriorates. Extensive decreases in biological value upon drying such solutions are accompanied by "browning" of the preparations. The intensity of the color is to some degree related to the extent of deterioration of the nutritive quality. The reduced biological value results from the reaction of amino acids with glucose. Feeding experiments with pure amino acid supplements indicate that histidine, threonine, tryptophan, phenylalanine, lysine and methionine become unavailable to the animal. Relatively small losses in amino acids as measured by microbiological assay were associated with drastic changes in nutritive value for animals. There appears to be an important difference in the nutritional availability to animals and to microorganisms of the amino acid-glucose reaction products.

232J. The effect of fat level of the diet on general nutrition. V. The relationship of the linoleic acid requirement to optimum fat level.
DEUEL, H. J. JR., GREENBERG, S. M., CALBERT, C. E., SAVAGE, EVELYN E., AND FUKUI, TOMOKO. *J. Nutr., 40,* 351-66 (1950).

Weanling rats fed a diet containing vitamin tested casein as well as sucrose, cellu flour, a salt mixture, and the synthetic B vitamins, developed symptoms of fat deficiency in 12 weeks. The injection of growth hormones in such fat deficient rats did not result in growth, but also did not cause death. A supplementation with 20 mg. of linoleic acid caused a prompt growth response which was not found augmented when level was increased to 60 mg. The injection of the growth hormone combined with the methyl linoleate caused a more rapid growth response. The administration of a 10% cotton-seed oil diet to rats receiving linoleate at an optimum level resulted in further acceleration of growth. This may indicate that the oil possesses some effect other than that of the linoleic acid.

FOOD PRODUCTS

BAKERY PRODUCTS

233J. The effect of temperature and time on cake batters.
GLABAU, C. A. *Bakers Weekly, 145,* 60-3, Feb. 27, 1950.

Part V (conclusion) of a series. Pound cake batters were submitted to 45 minutes bench time at 70°, 80°, 90° and 100° F. before baking. Batters held at higher temperatures produced improved cakes in most respects.

CEREALS

234J. The relation of age and viability to the popping of popcorn.
STEWART, F. C. New York Agr. Expt. Sta. *Bull.* No. 672 (1936).

A quantity of Japan Rice popcorn (some shelled, some on the cob) was stored in a cloth bag in an unheated storm house at Geneva, N. Y. for 14 years. At intervals of 4 to 18 months the shelled corn was tested for viability, moisture content, and popping expansion. The ear corn was tested but once—at the end of the experiment. The germination, which was 100% at first, dropped to 0 at the end of 8 years. The popping expansion of the shelled corn averaged somewhat higher during the first 7 years of the experiment while the corn was viable, than it did during the last 7 years after viability was completely lost. The fact that the moisture content of the corn varied considerably in different tests, and was often below the 13 to 15% required for maximum expansion, makes the results of the popping tests somewhat difficult to interpret. The final tests of shelled and ear corn made under parallel conditions, however, make it possible to draw the following conclusions; (1) Popping quality is entirely independent of viability. (2) Popcorn 14 years old pops nearly or quite as well as at any earlier age. (3) It is still unknown how long popcorn retains its ability to pop. (4) There is some reason for believing that popcorn on the cob retains its poppability better than does shelled corn.

235J. Experiments relating to the spoilage of washed eggs.
MILLER, M. W., JOUKOVSKY, V., AND KRAGHT, A. *Poultry Sci., 29,* 27-33 (1950).

Washing eggs does not necessarily result in the development of rots. Conditions must be such that the egg becomes inoculated with organisms that will develop into rots when favorable environmental conditions are established. Failures of commercial egg washing machines are probably due to the fact that the accumulation of filth and bacteria in the wash water inoculates the egg with rot forming organisms. Eggs can be success-

(Continued on back of following page)

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Abstracts

(Continued from page 6)

fully washed provided the wash water remains sterile, if the egg is not already infected. It will be advantageous to have the wash water warmer than the egg during the washing process. Processing of washed eggs in oil tends to reduce the percentage of black rots that develop but does not prevent the formation of green and mixed rots. Washing of dirty eggs even under the best washing procedures will not entirely eliminate the development of rots, if the eggs have been inoculated prior to washing.

236J. The functional properties and bacterial content of pasteurized and frozen whole eggs.

MILLER, C., AND WINTER, A. R. *Poultry Sci., 29,* 88-97 (1950).

Pasteurization of liquid whole egg at 140-142° F. for 4 minutes killed more than 99% of the standard plate and coliform bacteria. Pasteurization before freezing reduced the viscosity of frozen defrosted whole egg. Pasteurization and freezing increased the stability of whole egg foam as compared with that of the shell egg control, when measured by drainage. The beating time required for pasteurized frozen egg meringue was about 17% longer than for unpasteurized frozen meringue and about 8% longer than for meringue made with shell eggs. Pasteurization and freezing of whole egg had no significant effect on sponge cake volume, crumb color, texture and grain, tenderness, moisture or flavor. There was no significant difference in baked and stirred custards made with unpasteurized and unfrozen, frozen and unpasteurized, and pasteurized and frozen whole egg when judged by stiffness, color, texture, odor and flavor. Shell eggs, frozen egg, and pasteurized frozen egg produced no significant differences in egg scramble when judged by flavor, texture, tenderness and moisture.

FRUIT AND FRUIT JUICES

237J. Acceptance of fresh, frozen, and canned orange juices.

LOCKHART, E. E., AND GAINER, J. M. *Food Res., 14,* 429-33 (1949).

The two high-quality, canned Florida orange juices selected were significantly less preferable than either fresh juice or the two frozen juices tested. There was no significant preference between fresh, unsweetened, Florida orange juice, and the two brands of frozen juice studied. Fifty judges were employed. Paired comparison procedure used.

238J. D.D.T. residue studies of fresh grapes, juice, and jam.

TASCHENBERG, E. F., AND AVENS, A. W. New York Expt. Sta. *Tech. Bull* No. 286 (1949).

DDT spray residues on fresh grapes averaged 7.0 and 10.6 p.p.m. respectively on vines receiving three and four sprays of this material. Juice prepared from treated fruit was apparently free of DDT, but large amounts were found in the pomace. Several lots of grapes treated with DDT under field conditions were processed into jam according to commercial procedure. The steps in processing, beginning with the fresh fruit, are as follows: stemming and crushing, pulping finishing, and jam preparation. Wastes from the pulping and finishing process contained some DDT. Apparently a large amount of the residue is removed in wastes from the finishing machine. Some residue was found in certain lots of the finished pulp. DDT was not found in jam prepared from grapes treated with three sprays. Even with four sprays, one more application than is recommended, no residue was recovered from the jam. The findings on fresh grapes processed immediately after picking were similar to those on grapes frozen for three months before processing. In laboratory experiments, known amounts of DDT were added to finished pulp. DDT was recovered from samples of these mixtures when heated to 210° F. After making the finished pulp-DDT mixtures into jam, only a small portion of the original amount of DDT was recovered.

MEAT AND FISH

239J. Greenish discolorations of sausage.

NIVEN, C. F. *Nat. Provisioner, 118,* No. 10, 17 (1948); *Food Sci. Abst., 21,* 377, No. 1516 (1949).

Some cases of internal greening were observed but greening on the surface of sausages was more common. The latter, with one exception, was due to bacterial contamination of the surface after smoking and cooking. The bacteria responsible are not toxic and only impair the appearance of the sausages. The only bacteria which, in pure culture in the laboratory, caused greening of sausage were *Lactobacillus* and *Leuconostoc.*

240J. Bacteriology of shrimp. V. Effect of peeling, glazing, and storage temperature on bacteria in frozen shrimp.

HOLMES, D., AND MCCLESDEY, C. S. *Food Res., 14,* 401-04 (1949).

The number of viable bacteria in market shrimp was significantly reduced immediately after freezing at —40° C. (—40° F.). The reduction was greater in peeled than in unpeeled shrimp. Storage at —12° C. (10° F.) was more destructive to the bacteria in shrimp than storage at lower temperatures.

SIRUPS

241J. Some factors causing dark-colored maple sirup.

HAYWARD, F. W., AND PEDERSON, C. S. New York Agr. Expt. Sta. *Bull.* No. 718 (1946).

The chief factor in grading the quality of maple sirup is color. Light-colored sirup usually has a more delicate maple flavor than dark-colored sirup. The color of maple sirup depends upon the alkalinity of the sap and the invert sugar content. The extent of color development is limited by concentration of either of these factors and is accompanied by decrease in alkalinity and destruction of reducing sugar. Growth of bacteria causes increased alkalinity and inversion of sucrose, which, in turn, result in darker colored sirup. The bacteria grow even at temperatures slightly above the freezing point and cause significant deterioration in color. Cleanliness of equipment and rapid handling of the sap, therefore, are very important factors in production of high quality, light-colored maple sirup.

PACKAGING

242J. Experience with tin-free cans for vegetable and fruit preserves.

SERGER, H. *Arch. Metallkunde, 2,* 320-2 (1948); *Chem. Abst., 43,* 7602i (1949).

Black iron sheet cans are protected by plastic lacquer with or without previous phosphate coating. For most neutral vegetable preserves such cans, with the necessary manufacturing precautions, are equivalent to tin cans. For acid-containing vegetables only limited storage times are recommended and for fruit preserves, Sn-free cans are not recommended.

243J. Tomato-film findings.

ALLEN, A. S., AND ALLEN, N. *Mod. Pack., 23,* 123-6, Feb., 1950.

A study of the packaging of fresh tomatoes in cellophane and cellulose acetate films. It is concluded that delivery of satisfactory pre-packaged tomatoes can be assured by (1) packaging top quality tomatoes with maximum visibility in the package; (2) using intermediate or high moisture permeable films; (3) providing adequate ventilation of the packages; and (4) maintaining quality at the retail level by rigid inspection.

PATENTS

244J. Method of stabilizing dried starch sirup.

NORDENSKJOLD, T., AND JONSSON, E. A. 2,501,406, Mar. 21, 1950.

A method of manufacturing a dry, powdered starch syrup product, containing as its main ingredient a dried starch syrup composed to a major extent of dextrose and dextrins and made by the hydrolysis of starch, comprising mixing starch syrup and milk and spraying said mixture into a drying tower to convert said mixture directly into a dry powdered condition, and subjecting it to the action of a hot current of air to produce a dry powdered composition directly containing the various constituents of the solids of the starch syrup and the milk substantially unchanged, said final composition being substantially free from the tendency of dried starch syrup to absorb humidity.

(Continued on page 15 following technical papers)

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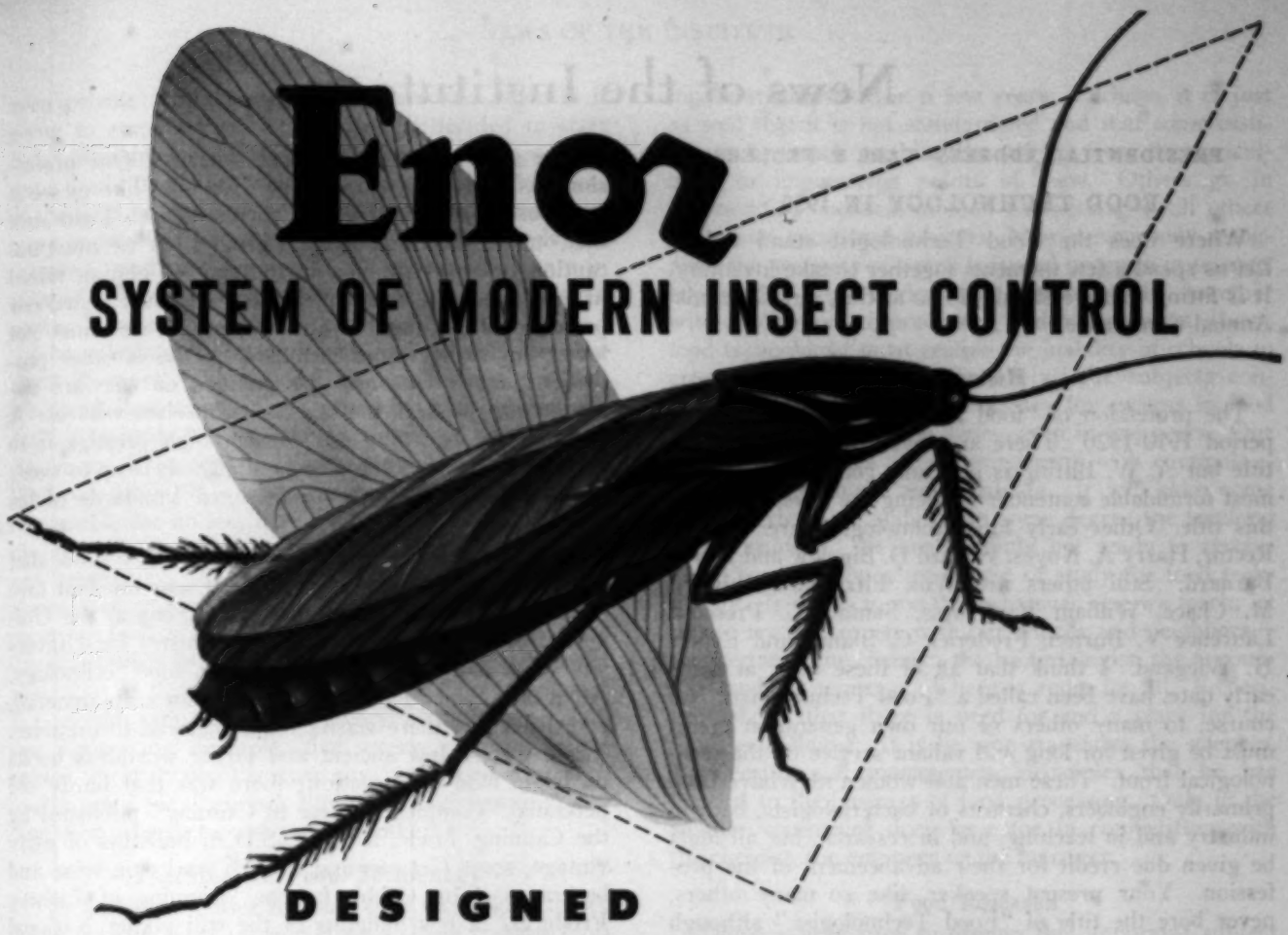

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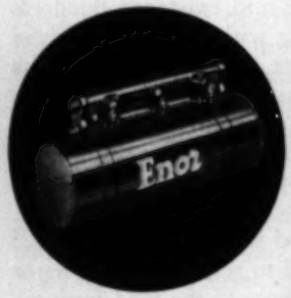

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News of the Institute

PRESIDENTIAL ADDRESS—CARL R. FELLERS

FOOD TECHNOLOGY IN 1950

Where does the Food Technologist stand today? Let us spend a few moments together to take inventory. It is fitting that we should do so at this, our Decennial Annual Conference.

Historical

The profession of "food technologist" began in the period 1910-1920. There are several claimants to the title but A. W. Bitting is generally conceded to be the most formidable contender for being the "first" to carry this title. Other early food technologists are Thomas Rector, Harry A. Noyes, Willard D. Bigelow and Harry Barnard. Still others are Wm. Fitzgerald, Edward M. Chace, William V. Cruess, Samuel C. Prescott, Laurence V. Burton, Frederick C. Blanck and Ernest H. Wiegand. I think that all of these men, at some early date, have been called a "Food Technologist." Of course, to many others of our own generation credit must be given for long and valiant service on the technological front. These men and women may have been primarily engineers, chemists or bacteriologists, both in industry and in teaching, and in research, but all must be given due credit for their advancement of the profession. Your present speaker, like so many others, never bore the title of "Food Technologist," although variously employed as a sanitarian, chemist, bacteriologist, food consultant and teacher. Probably not more than 10 percent of the present 3000 members of our Institute are labeled "food technologists" at the present time. Although the term was "coined" about 40 years ago, it lay in Limbo until resurrected and given respectability by our Institute at the time of its organization 10 or 12 years ago. When one considers the record, the progress of the profession has been rather remarkable. In the last 10 years, the profession has been recognized by name in many places, such as state and federal civil service commissions, government bureaus, universities, canning, freezing and other food industries, by editors in many fields, by the military establishment, by our sister institutes and societies, such as the A.A.A.S., A.C.S., A.S.R.E. and the A.S.H.S. To-day, nearly every scientist and engineer knows approximately what a food technologist does. Do you know what technology means? While at the Pentagon about a month ago on duty with the General Staff, I had to comment on a proposed new Unification Act for the Armed Forces being introduced in Congress. Well, throughout this Act the word "technician" was used instead of "technologist"—so I prepared the usual indorsement, properly defining the two terms, for the signature of a staff officer. Well, to shorten the story—a technologist is one "who possesses systematic knowledge of the industrial arts, especially of the more important manufactures, such as metallurgy, textiles and foods." Another shade of meaning given by Webster is "one who has knowledge of any practical art utilizing scientific knowledge, such as horticulture or medicine; applied science as contrasted with pure science." Our profession has a perfectly good name. I should like to see it more used—especially in its correct sense. I am sure that our profession is on solid ground but we must use caution to avoid slipping in the clay or getting mired in quicksand. By this I mean that we must guard our professional heritage carefully, that is, we must not lower our standards of membership. As is other professions, many who are not qualified or who are unscrupulous will seek to associate themselves with us. A sure way of lessening our present high prestige is to accept into membership all who apply. It is up to every member to maintain the professional standards of his institute.

As I look back on my own experiences, I think that I became aware that food technology was my first love about 1922 while teaching and researching at the University of Washington. I had left industry for University work and was required to teach food technology. All at once, when I began to organize my class material, I realized that there wasn't much material to organize. There were a few ancient and rather worthless books on home food preservation; there was that hardy old perennial "Complete Course in Canning" published by the Canning Trade, a few U.S.D.A. bulletins of early vintage, some German and French works on wine and beverages, John Cobb's famous "Canning of Fishery Products," a few bulletins of the still young National Canners Association, and a very few journals such as "American Vinegar Industry" whose name was later changed to "Fruit Products Journal," "The Canner," "The Canning Trade," "The Pacific Fisherman," "Fishing Gazette," and the "Konserven Industrie." There were a few texts dealing with food chemistry including the A.O.A.C. (much reduced in size as compared to the present 6th edition) and of course the famous old "Zeitschrift für Nahrungs-und Genussmittel" (later the Z. für Unterschungs-Lebensm), and the French "Annales des Falsifications." In the intervening years there have come into existence hundreds of texts and periodicals dealing with various aspects of food technology. The younger generation may think that there was always a generous literature in food science, but it is not so. Furthermore, the literature that was available often dealt in generalities, for writers dared not describe their employee's processes. Business secrets were much more entrenched in those days.

Needless to say teaching food technology before 1925 was not an easy task. One had to rely pretty largely on experience and in applying science to the food business. Food technology was in the making. But it was a challenge and we old-timers like Cruess and Wiegand and Prescott enjoyed it.

And today—what a contrast! There is so much literature on the subject of foods that a man cannot possibly read it, to say nothing of digesting it. Already, we are forced (as the chemists were many years ago) to resort to abstract services of various kinds—Chemical Abstracts, Biological, Nutrition, Refrigeration Abstracts, trade journal abstracts, patent abstracts and

even private abstract services. Where and when is it going to stop? When a group of us decided to start *Food Research* some fourteen years ago, there was some doubt that there would be enough research papers in the field to warrant its publication. For many years more papers have been received than could possibly be accepted—and now we are nearly a year in arrears in spite of the most careful selection of papers, and then cutting them to the bone.

I have been an abstractor for *Chemical Abstracts* for about 25 years. The reason I am an Abstractor is that I noticed that many of the newly started publications dealing in foods were not being abstracted in *Chemical Abstracts*. Promptly, Dr. Crane tagged me for the job. Well, up until 1941, when the war came along, I was responsible for no less than twenty journals, plus all of the Experiment Station bulletins from the 51 states and territories. At present, I think there are nine abstractors carrying on the work that I once did in covering food science literature—and much the same situation exists in *Biological Abstracts*. These abstract journals are time- and life-savers (no pun intended). We should support them in every possible way. Did you know, for example, that every relevant article published in FOOD TECHNOLOGY and *Food Research* is abstracted for Chemical, Biological, Refrigeration and Nutrition Abstracts, and possibly others?

Teaching of Food Technology

The first universities to teach food technology as we define it today were Oregon State College and the University of Massachusetts in 1918. In neither school was there a major course of study for a few years. A number of other universities have taught courses in food technology or its special branches for almost as long as those mentioned, such as California, Washington and Michigan State. Of course, well-organized courses in dairy industry and cereal technology have been offered since 1900, or even earlier. In the past, dairy, cereal and fishery technology have been taught in departments of their own. At present, in some schools, food technology includes all foods; in others all but meats and dairy, and in still others poultry, sugar or cereals are taught in other departments—especially where subjects involving them were taught before the more inclusive "food technology" curriculum was introduced. Some institutions with engineering leanings prefer to use the unit operations method of teaching fundamentals of food technology. Others handle course matter by subjects. Our present teaching of food technology is certainly in a state of flux and change. Old established dairy, cereal, fisheries or meat departments don't like to see a new "food technology" department take over their work. In some cases, dairy departments have expanded to include all other foods. This is a logical process.

The same unit processes and the same basic fundamental principles of producing, processing and distribution are used for foods—whatever the source. In the interest of economy, honesty and reasonableness, the food technology department should include the handling of all processed foods—not a part of them. Rome was not built in a day. Neither will food technology teaching be standardized in a few years. Perhaps, it is just as well that it is not standardized and that some institutions approach teaching the subject from the agricultural or engineering points of view. Others go in for modified chemical or food engineering—still others emphasize vocational subjects. Nearly everybody recognizes the necessity of a well balanced program in science, engineering and agricultural fundamentals, together with applications to processing and management. Every food technologist must realize the inability of schools to crowd into a 4-year curriculum all the subjects considered desirable or even necessary for success in food processing. It cannot be done—even in five years. Our several universities are experimenting with curricula—both undergraduate and graduate. It will take some years, perhaps, to stabilize in some degree the teaching of the subject. We are certainly not ready to recommend for adoption a set course of study for food technology. It seems to me that whatever else we teach, let us not try to compete with our friends and neighbors—the engineer, the chemist, the bacteriologist, the agronomist and the manager. There is room for all. Experience shows that there is need for and a place for the food technologist. It is he who translates the sciences, engineering and management principles that he has learned to the business of food processing. Only in the smaller companies does he come in competition with the chemist, the engineer or the manager.

Food Research

There is little need to discuss this important subject because on research and its applications our food industries depend. Food research has been phenomenally successful. We lead the world. We have more persons engaged in scientific and technological research in foods than all other countries combined. No wonder we have so many students, trainers and visitors from foreign lands to learn the secrets of our success, and our scientific and engineering know-how. Both subsidized research in such agencies as the U. S. Department of Agriculture, Fish and Wildlife Bureau, the Regional Laboratories, our 51 Agricultural Experiment Stations, and private research in the laboratories of our food corporations, large and small, are responsible for reaching and retaining the present leadership of our country and Canada in food teachnology. Still, the amount of private money actually spent for research in the food businesses is pitifully small—probably not more than two percent of the total sums appropriated for operation. Of course, we should not forget the subsidized research, the results of which are available to the industry as a whole. Our Institute with its publications, its Annual Conference and the hundreds of meetings of the 20 Regional Sections has become an important factor in fostering, and in the dissemination of food research.

Our food industries are in a healthy position in 1950. We are fortunate that we deal in a commodity so necessary as food. We need it in good times and in bad times. We spend nearly one-third of our paychecks for groceries. We have an unsurpassed variety of foods to choose from in our stores and markets. Private capital has invested heavily in the food business — it has

(Continued on page 12 following technical papers)

ALUMINUM FOIL AFFORDS MAXIMUM PROTECTION FOR FOODS

Conclusive findings revealed in tests by acknowledged experts in foil packaging...world's largest producers of Aluminum Foil:

Reynolds Metals Company

Aluminum foil's outstanding performance record for protection in modern food packaging is predicated upon a combination of advantages recognized by food technologists.

Foremost is its high resistance to Moisture-Vapor Transmission. It prevents dehydration of frozen foods—protects dehydrated foods against moisture—and is impermeable to volatile oils, odors and light rays.

In addition, aluminum foil is highly adaptable to many different types of packaging operations. It is fabricated into all foil-packages, containers and overwraps. And it is combined with other materials in laminated foil packaging to meet the most exacting and varied requirements of the packaged foods and allied industries.

The Reynolds Metals Company has spearheaded the development and advance in all forms of foil packaging. The sturdy, multi-purpose *Reynolds Pak*, a one-piece semi-rigid tray with crimp-on lid, enjoys wide acceptance in many branches of frozen and ready-cooked food packaging and consumer home-freezing operations.

In the broad field of laminated foil packaging, Reynolds has led in the research and development of a great number of combinations of aluminum foil with various types of paper and plastic film. These have been produced to meet the precise requirements of the product to be packaged, as well as those presented by the existing wrapping and sealing equipment of the manufacturer. Thus it is possible to utilize the protective qualities of aluminum foil at acceptable packaging costs.

"*Reyseal*" is the trade name of one such type of Reynolds laminated foil material. It uses wax in the body of the sheet to effect a heat seal at the point where heat is applied. "*Reyseal*" is manufactured in different weights and types. It has proved eminently superior to other packaging materials for many food products, in exhaustive laboratory tests conducted by Reynolds Research Laboratories. Specific products are submitted to rigidly controlled conditions of heat and moisture by Reynolds technicians, to determine the relative protective values of different foil and foil-laminated packaging materials, as against other types. Following is a test case in point:

PRODUCT: A packaged pudding mix.

CONDITIONS: Six weeks at 100° F., 80-85% relative humidity.

MATERIALS:

1. Reyseal "509" carton without liner.
2. Reyseal "509" carton with glassine liner, heat sealed.
3. Reyseal "509" carton with duplex glassine bag.
4. Non-foil carton and liner.

RESULTS: Product in Package 2 maintained freshest odor and best color at end of test period. Cooking tests showed product in Package 2 to be superior in flavor and texture. Package 2 provided six times more protection against moisture than Package 4; Package 3, one and three-fifths times more. Package 1, without liner, proved superior to Package 4, but the differential was naturally less.

RECOMMENDATION: Package 2.

Food product manufacturers and packers are invited to submit product samples for testing. Address requests to:

Reynolds Metals Company
Richmond 19, Virginia.

REYNOLDS ALUMINUM

Strawberry Social here tonight!

-and of course everybody will come-

There's **NORDA STRAWBERRY** flavor

In the ice cream and cake -

TRY SOME

Good old-fashioned real strawberry flavor is a good old summertime favorite. Norda Strawberry Flavor is crammed with the true-fruit richness.

Try it. Test it. And taste it. We believe you'll agree it is good—very good. Don't you like that *more strawberry* taste?

Both Norda genuine Strawberry and fine imitation Strawberry will help you make better-tasting, *better-selling* gelatins, mixes, candies, syrups, and baked goods.

Send for *free samples* today. Ask for your Norda Flavor Catalogue, too. Come to Norda for *successful* flavors.

Norda Strawberry . . .

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News of the Institute

(Continued from page 9 preceding technical papers)

stability. As Americans, we eat well—we demand the best in quality and nutrition. In order to give the year-round variety which Americans demand, it is necessary in this climate, to make extensive use of canned, frozen and otherwise processed and prepared foods. This is good for business—good for engineers, good for salesmen and good for food technologists.

In conclusion, may I thank most sincerely my fellow officers, committee workers, employees of the Institute, and the several regional sections and the hundreds of loyal members of the Institute who, by their work encouragement and loyalty, have put the Institute on a solid professional and financial basis. I ask for my successor and his many helpers the same unstinted and loyal support which you have given me during the past year.

I step down now as your President. There is still much to be done, many problems to face but I have full faith that each problem will be solved and that our Institute will go on to greater accomplishment, glory and recognition.

PRESENTATION OF THE 1950 BABCOCK AWARD

On May 22, 1950, during the Tenth Annual Convention of the Institute of Food Technologists, the Babcock Award for 1950 was presented to Dr. Carl R. Fellers of the University of Massachusetts and President of the Institute of Food Technologists. The following are the remarks of Dr. C. G. King of The Nutritions Foundation Inc., of New York, N. Y., who presented the Award to Dr. Fellers:

Dr. Sharp, Professor Hart, Members of the
Institute of Food Technologists, and Guests:

The Stephen Babcock Award is a symbol of scientific progress, ideals and responsibility in the food industry. Only one younger generation has been at work in his field of exploration since Professor Babcock opened a few doors to show what a chemist could do to help manufacturers furnish the public with foods of assured composition and nutritive quality.

Surely, we are justified in expecting greater accomplishments in the years ahead, in the development of new and superior foods, when scientists have such advantages as the following:

First: An advancing science of nutrition, so that we may look forward to the day when the composition and functions of food can be measured and understood in terms of *all* the useful nutrients;

Second: A rapidly growing science of genetics, to guide in deliberately planning raw products according to needs, instead of having to wait for genetic accidents;

Third: An industrial product outlet, estimated to reach approximately thirty-two billion dollars per year for consumers in the United States alone in 1950, with more than two-thirds of the world's population still regarded as underfed; and

Fourth: An opportunity to process foods in a myriad of revolutionary ways, using new forms and intensities of radiation, almost any range of temperature and pressure desired, new metals, new plastics, air transportation, and apparently soon to have the advantage of communicating with any part of the world, instantly by sight and hearing.

The recipient of the Stephen Babcock Award well merits the tribute that is extended by the Institute.

Our fellow Charter Member of the Institute, Carl R. Fellers, was a pioneer in studying the critical role that variations in processing can play in controlling nutritive quality. Some 40 of his 185 scientific papers carry reports in that field.

In other areas of technical advance, he guided the introduction of pasteurization as applied to dried fruits (1929), the use of ascorbic acid as an antioxidant (1939), and numerous advances in canning techniques, especially as they apply to sea foods.

One needs only a normal imagination to realize how full his present schedule is, from the fact that in the Food Technology Department, of which he is Head, at the University of Massachusetts, there are 40 graduate students, including 15 from foreign countries, working toward advanced degrees.

In professional organizations, Dr. Fellers has been generous of his time and energy, as shown by his service as Secretary and Chairman of the Food and Nutrition Section of the American Public Health Association, Secretary and Chairman of the Agricultural and Food Chemistry Divisions of the American Chemical Society, an officer in both World Wars, plus 27 years as a reserve officer, and an editorial staff member of at least four technical journals and several technical bulletins. It is a happy circumstance that he is now President of the Institute of Food Technologists.

It is a pleasure, Dr. Fellers, to present this Award to you, in recognition of your contributions to food technology, with special reference to the nutritive quality of foods, and your notable contribution, thereby, to human health.

BABCOCK AWARD ADDRESS

THE SPIRIT OF RESEARCH

CARL R. FELLERS
University of Massachusetts, President, Institute of Food Technologists

Science is organized knowledge. Great reservoirs of human knowledge have accumulated through the ages, century by century, and generation by generation, until now its great bulk fills massive libraries. Mere man is totally incompetent to acquire in a short lifetime more than a mere segment of this vast storehouse of knowledge. Thus, today, unlike Aristotle, or Bacon or St. Thomas Aquinas, those scholastic giants of yesterday, we must confine our feeble efforts in scientific inquiry to relatively narrow spheres of science. Only one hundred years ago we had in our universities Professors of Science, or Professors of Natural Philosophy. Later, as science became more diversified, we had Professors of Natural Science, including Earth Science, Chemistry, Physics and Agriculture, as separated from Mathematics, Philosophy and Astronomy. Let us consider Chemistry for a moment. It is now impossible for a

(Continued on page 14)

Proud of its past record,
THE BREWING INDUSTRY
continues as a leader in the support of
PURE SCIENTIFIC RESEARCH

In his recently published book, "The Yeast Cell—Its Genetics and Cytology," Dr. Carl C. Lindegren, world-famous yeast geneticist, pays high tribute to the Brewing Industry for its honorable record throughout the years in so generously lending its financial support to many outstanding achievements in Pure Scientific Research.

Dr. Lindegren gives this partial summary of brewery-supported research:

> "The Carlsberg Brewery supported Hansen, the inventor of the pure culture technique; Sorenson, the inventor of pH; Kjeldahl, whose nitrogen determination is a byword; and Winge, who brought yeast genetics into being. Joule determined the mechanical equivalence of heat in a brewery laboratory. Modern statistics are based largely on the word of Student, an employee of the Guiness Breweries in Dublin. Beijerink, whom many consider the most penetrating student of the biology of yeasts of the last century, was largely supported by a brewery in Delfth; and his successor, Kluyver, from whose laboratory have come some of the very important advances in enzymology and zymology, has lived up to the standards set by his illustrious predecessor. Henneberg's work was also supported primarily by German breweries, and we are indebted to him for the discovery of food yeast, a source that may one day provide much of the world's proteins and vitamins. Finally, Pasteur's germ theory of disease has its origin in his demonstration that fermentation is caused by micro-organisms. He developed his concept of disease in the course of his successful attempt to discover the cause of spoilage of beer in the French breweries. It is safe to say that very few industries have contributed as much to modern biological thought as the brewing industry."

For more than eight years, Dr. Lindegren and his group of co-workers have engaged in intensive research in the field of Yeast Genetics. In his new book he credits the generous financial support of his laboratory by Anheuser-Busch, Inc., with having made this work possible.

Today, at Anheuser-Busch, a staff of more than fifty scientists is engaged in research which has resulted in the development, growing and harvesting of special yeasts rich in proteins and B-complex vitamins.

You may be interested in the nutritional *plus* which yeast can provide at minimum cost. Why not write for your copy of TWENTY FOODS. It is an interesting comparative tabulation of essential factors such as Thiamine, Riboflavin, Niacin, Protein, Iron, Calcium, Phosphorus and calories in twenty of our food staples.

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Please send a copy of your "TWENTY FOODS" to

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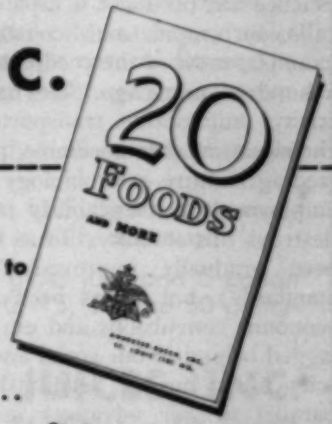

News of the Institute

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chemist to be well versed in all branches of chemistry, for this science has become so diversified and specialized that a lifetime would be spent in acquiring the necessary knowledge and technics of each of the 30 or more branches of chemistry. Similarly, in Agriculture, as late as 1900 we had Professors of Agriculture; now we have great Colleges of Agriculture where perhaps 50 important aspects of the subject are taught and studied. Today, we have perforce become specialists; we have no choice. In his essay on "Criticism," Alexander Pope wrote "One science only will one genius fit, so vast is art, so narrow human wit." A few exceptional men have mastered two or more sciences but it is not the rule. Even a food technologist cannot possibly read the publications that cover his field today, to say nothing of the supporting and related fields of engineering, chemistry, physics, microbiology and agriculture. We skim over lightly the various abstract journals and publications, we can do no more—that is, if we have work to do and a living to earn.

As one by one, I have sent my children to begin the prescribed 16- to 18-year course of study to which they must be exposed in our public schools, I cannot but be reminded of the complexity of life today, of the vast effort each individual must make, and of the years of preparation which are required to attain even average so-called cuture and proficiency. Yet, our schools and universities are a part of the American heritage. When our schools fail for any reason to inculcate knowledge, wisdom and morals, the foundations on which human society rests begin to weaken and crumble. Can this happen in America? Is it happening now? We must be on our guard lest sinister influences wreck and confuse the pliant minds of our youth. Our citadels of learning are just as vulnerable to attack by infiltration and seizure of power as are nations and empires. Let us not forget that Plato once said "The direction in which education starts a man will determine his future life." And learning must not stop when formal education ends, else a man loses out in the ceaseless competition of life among his fellows. Yet, Science marches on. It cannot be stilled. Scientific discoveries have actually created many of the social problems of the present. Science has produced a rapidly changing society which calls for rapid and constant readjustments. For example, most of the occupations of today did not exist a hundred years ago. We have only to think of electricity, automotive transportation, air craft, organic chemicals, modern medicine, petroleum, radio, mechanized agriculture, microbiology and atomic energy. Self-employment lends stability to our economy; industry destroys this stability. True, the standard of living has been gradually improved (according to American standards), but it has been at the expense of titanic economic convulsions and unrest. Apparently, we have lagged behind in our social and economic research. The science of human relationships must be developed parallel to our advances in physical and biological science.

Pure and Applied Science

I, for one, disagree with the usual distinction made between pure and applied science. Long ago, there may have been some possible distinction, but if there was a tangible difference, it has largely disappeared. Could the discoveries of Edison, Marconi or Pasteur be called "pure or fundamental," any more than they were "applied and practical"? Rare indeed is the problem in pure science that is entirely divorced from utility, or possible utility. To state that pure scientists are unconcerned with the practical results of their discoveries, maligns them. Atom smashing and fission have already yielded most practical results — both good and bad. Careful rechecking of the atomic weights of the elements finally demonstrated the presence of isotopes, those most useful tracer elements which already have yielded such practical results in the fields of physiology, and plant and animal nutrition.

Do we study chemistry for the sake of "chemistry" alone, or is it for possible use at some later date? The same deduction holds for physics, bacteriology and for mathematics. True, we require a working knowledge of so-called fundamental sciences in order that we may make use of them in solving the every-day problems which confront us in the profession of making a living. Only teachers of pure science study the sciences for the sake of subject matter alone, and even this is doubtful, because they plan to use the knowledge in their profession, i.e., teaching the subject to others. Indeed, applied science often points the way to needs in pure science. Thus, we may wish to know the physical and chemical properties of a certain alloy, or organic compound, or what happens when A reacts with B. There are many examples of where applied science or research has uncovered the basic problem, and has led to "pure" scientific effort. In fact, it has been said that applied science has now outrun the fund of "pure" theory that is available, and that we need new principles, new theories, new formulas, new hypotheses! However, I suspect that there are still ample practical applications of the profitable use of the "pure" science already available to us. By this statement, I do not decry nor disparage pure science, nor do I underrate its future value. I am simply trying to point out that the so-called differences which some teachers and scientists have made so glibly between the applied and the "pure," have little support in fact.

Meaning of Research

Research has been repeatedly defined. Thus, Kinter states, "Research is the reconnaissance party of industry, roving the unknown territories ahead independently, yet not without purpose, seeing for the first time what all the following world will see a few years hence." Originally, the term "research" typified the more advanced and fundamental character of investigation. Recently, however, the term has been used much more loosely. Advertising of foods and other commodities has brought about a subtle change in meaning of research to the public. Obviously, much of the so-called "research" carried on by some industries, and reported so volubly and without restraint by radio and pen, can

(Continued on page 16)

Abstracts

(Continued from opposite page preceding technical papers)

245J. Preparing vitamin E enriched oil.
McFARLANE, W. D. Assignor to Victory Mills Limited. 2,497,317, Feb. 14, 1950.

The process for preparing a vitamin E enriched oil from wheat germ comprising extracting the wheat germ with a boiling alcohol-water solvent containing 88-92% alcohol; cooling the extract to a lower temperature at which a major portion of the oils extracted from the wheat germ are thrown out of solution, said major portion being of such a nature that vitamin E is substantially insoluble therein; separating the said major portion from the cooled extract; removing the solvent from the cooled extract by evaporation; taking up the resulting residue in hot water and centrifuging to produce a lipoid phase and an aqueous phase, separating and drying the lipoid phase and extracting the same with acetone, separating the extract, and evaporating the remaining acetone from the solution to produce a vitamin E enriched oil containing the bulk of the vitamin E content of the original wheat germ.

246J. Stabilized milk products.
O'LEARY, D. K. Assignor to E. I. du Pont de Nemours. 2,497,320, Feb. 14, 1950.

A product of the group consisting of milk, condensed milk, evaporated milk, and dried milk to which has been added from 0.05 to 1% by weight of a 3-(mercapto) proprionic compound having the linear structural formula $ROOCCH_2CH_2S—X$ in which R is of the group consisting of hydrogen and hydrocarbon groups and in which the monovalent substituent X is an oxygeneated hydrocarbon.

247J. Method of making culinary mixes.
JOHNSON, O. Assignor to Ford, Bacon & Davis, Inc. 2,499,586, Mar. 7, 1950.

A method of making a culinary mix having ingredients comprising flour and shortening in proportions to form an edible culinary product when the mix is mixed with an aqueous edible liquid and baked, which method comprises mixing the ingredients of the mix comprising flour with shortening in a liquid, super-cooled condition.

248J. Method of food preparation.
MARSHALL, L. K. Assignor to Raytheon Manufacturing Co. 2,501,400, Mar. 21, 1950.

In a method of preparing food, the steps of precooking the raw foodstuff, freezing the precooked food, and subjecting the frozen precooked food to microwave energy to heat it to eating temperature.

249J. Concentrated milk food product and process of preparing same.
HOECKER, W. H., AND HAMMER, B. W. Assignors to Golden State Company, 2,501,445, Mar. 21, 1950.

The process of producing a product derived from milk, which is free from cooked flavor, has good keeping qualities at refrigerating temperatures, has a plastic consistency rendering it readily spreadable, has a uniform and smooth texture, and is resistant to any substantial change in viscosity throughout the range of temperatures ordinarily encountered in storage and use, which comprises concentrating whole milk to an extent to produce a total solids content, including butterfat to be subsequently added, of approximately 40% to 70% by weight, adding butterfat in quantity to adjust the ratio of butterfat to milk solids not fat, to a value within the range of approximately one-half of one part to approximately one and three-fourths parts of fat, for one part of solids not fat, heating the concentrated mixture to a temperature of from approximately 150° F. to approximately 190° F. for a period of from approximately one-half a minute to approximately thirty minutes, and then homogenizing said hot mixture before any substantial drop in temperature occurs at a pressure of from approximately 500 pounds per square inch to approximately 3500 pounds per square inch.

250J. Hydrolysis of pectin.
BULMER, H. P. LTD., AND GARRICK, P. Brit. 625,675, July 1, 1949; *Chem. Abst., 44,* 245e (1950).

Pectinic acids, which with sugar solutions, form jellies of high setting power are prepared by hydrolyzing pectin with an alkali at 0-30° under an inert (nonoxidizing) atmosphere and in the presence of an antioxidant (i.e. hydroquinone).

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You can control flavor

in Meat Loaves, Sausage, Chili Con Carne, Canned Meats

by using High Quality, Accurate Strength, Natural Flavor

Garlic and Onion Juice

The exclusive process used by Vegetable Juices, Inc. since 1928 produces the juices of onions and garlic in a scientific manner to assure standard strength of juice the year 'round.

- made of fresh, raw garlic and onion
- retain all essential oils, esters and volatiles giving complete natural flavor
- standardized for exact seasoning strength
- distributes evenly and quickly throughout product
- meets all M.I.D., U. S. Dep't. of Agr. requirements and is fully approved

Available in 1 gallon glass jugs and 5 gallon clay jugs; also in 5, 10, 15, 30 and 50 gallon barrels.

VEGETABLE JUICES, INC.

664-666 W. Hubbard St., Chicago 10, Illinois

News of the Institute

(Continued from page 14)

scarcely be dignified by the name in its true meaning. Too often, it is simply the collecting of more or less pertinent data for use by the advertising branch of the firm. I like the definition of research as given by the Office of Experiment Stations, U. S. Department of Agriculture:

"Research as commonly understood, means more than the mere accumulating of data or the compiling of information; it means gathering data for a particular purpose guided by ability to discern the kind of data necessary, to weigh their adequacy, and to interpret them, rather than to merely summarize them. Research is not only an advanced type of inquiry, but a mature effort, dominated by an attitude of intellectual curiosity. It is this mental attitude which impels the investigator to be exacting of himself, to search beyond the empirical information in the attempt to understand obvious facts and occurrences. The under-development of wonder and imagination, or desire to go beyond the superficial and the obvious, retards investigations in certain lines, and makes workers satisfied to follow a set formula of conventions. Such limitations give comparative results good only for the time and place, but not substantial general fact or understanding of relationship between the effect and the cause."

Research means different things to people in different walks of life. American industry does not need to be convinced of the importance of research. On every hand we see what patient fact-finding has done to improve everyday existence. The laborer of today enjoys luxuries denied kings less than 50 years ago, largely through contributions of science to the conveniences of life, which most of us already regard as necessities. The skeptic may tell you that research consists of proving the obvious in a most thorough manner by laborious means. The most fundamental requisite of a research project is the *idea*. A disciplined imagination is at the bottom of every great discovery. The researcher must be looking for something. He may not know exactly what he is looking for, but he knows enough about the situation to recognize the presence of an unsolved problem. A person with an idea and who also possesses a capacity for critical analysis, is at least partially equipped to solve the problem. If, in addition, he is a master of a method or procedure which can be used in the investigation, the chances of success are even more promising. Frequently, however, these two abilities are not associated in the same person. The obvious conclusion, therefore, is that for the most successful prosecution of research, it is necessary to combine the talents of two or more scientists or technologists, so that a fusion of effort may more speedily yield success to the research project. An experienced project leader also greatly enhances the probability of success.

A new fact is a priceless possession and the names of men who have contributed a single important fact to our storehouse of knowledge have been immortalized. However, it is reassuring to know that progress can also be made by the synthesis or collation of well known facts, through deductive reasoning, and through minor improvements, without the painful and slow birth of a new idea.

I cannot emphasize too strongly the value of keen observation in a research worker. This particular faculty should be more carefully cultivated in graduate students and in young workers in science. Keen observation, coupled with sound scientific training, with or without experience, is invaluable. In our daily work we should carefully note the exception, the unusual, the apparent failure or no-compliance with theory or pattern, for these may be the clews to new discoveries. Fleming, as early as 1929, noted the inhibiting effect of *Penicillium* upon *Staphylococcus aureus* when grown on agar plates. I am sure that thousands of bacteriologists, including many in this room, have made similar observations, namely, that molds often interfere with the growth of bacteria in test tubes and Petri dishes containing solid nutrient media. We considered molds as "laboratory weeds," and their occurrence usually due to faulty technics. Some of us even isolated mold enzymes and demonstrated their killing power on bacteria *in vitro*. Wherein did Fleming and Florey differ from all other bacteriologists? Merely in their power of observation and deduction. Thus they argued, if *Penicillium* kills bacteria in a test tube, why not in the human body? As simple as that! Great credit is due the man who first appreciates and demonstrates the application of a discovery. Thus, Fleming and Florey discovered penicillin—one of our most powerful and life-saving antibiotics. Incidentally, their work has directed thousands of scientists to further research in antibiotics, all to the great benefit of the human race. On one man's keen powers of observation and deduction from known facts, rests the whole modern development of antibiotic therapy.

Research is still an open field with opportunity for all — both the brilliant scholar and the industrious plugger. Research builds on foundations already constructed by others who have gone before. Sir Isaac Newton paid a lasting tribute to his predecessors when he said that if he saw a little farther than others it was because he stood on giant shoulders. The challenge is ours to provide the shoulders on which the future investigator will stand, and from which he, in turn, will peer beyond the present horizons of knowledge into the great unknown. That is the spirit of research.

PRESIDENT PAUL F. SHARP ANNOUNCES COMMITTEES FOR THE YEAR

The following committees have been announced by President Sharp. These committees will function for the year ending with the next annual meeting of the Institute:

1. To represent the Institute on the Committee of the American Association for the Advancement of Science: Carl R. Fellers and Harry E. Goresline.

2. *Babcock Award Committee:* E. D. Clark (1951), Charles N. Frey (1951), E. H. Harvey (1951), Alfred J. Finberg (1952), F. P. Griffiths (1952), Fred W. Wenzel (1952), F. C. Blanck (1953), Victor Conquest (1953), W. V. Cruess (1953).

3. *Committee on Constitution:* Aksel G. Olsen, Chairman; Arthur N. Prater, W. L. Campbell.

4. *Committee on Education and Curriculum:* M. E. Highlands, Chairman; Horace Campbell, John L. Heid, Walter A. Maclinn, Roy E. Marshall, Robert W. Pilcher, Herbert N. Riley, George C. Scott, Ernest H. Wiegand.

5. *Committee on Finance:* Philip K. Bates, Chairman; B. S. Clark, Aksel G. Olsen.

6. *Committee on Membership:* Louis B. Howard, Chairman; Charles S. Lawrence, Secretary. Other members will consist of the Chairmen of all Regional Section Membership Committees.

7. *Program Committee for 1951 Annual Meeting:* Charles N. Frey, Chairman; Aksel G. Olsen, W. L. Campbell, Henry R. Kraybill, R. T. Bohn, David B. Hand, Arnold H. Johnson, Mary E. Pennington, Louis B. Howard, B. S. Clark, L. E. Clifcorn, Bernard L. Oser, Arthur W. Farrell.

8. *Committee on Nominations:* W. Ray Junk, Chairman; George F. Stewart, Frank L. Gunderson, Ray B. Wakefield, B. L. Herrington. And Chairmen of all Regional Sections.

9. *Committee on Publications:* Walter D. Pheteplace, Chairman; John T. Knowles, Philip K. Bates, Carl R. Fellers, George F. Stewart.

10. *Committee on Qualifications:* E. M. Chace, F. C. Blanck, James C. Moyer.

11. *Committee on Regional Sections:* John L. Heid, Chairman; Charles J. Meister, W. H. Cook, W. Clifford Scott, Roger V. Wilson, J. G. Woodroof, F. E. Atkinson, J. A. Dunn, Ernest H. Wiegand, R. H. DeWaters.

12. *Committee on Student Membership:* Arthur S. Levine, Chairman; Robert G. Tischer, C. Wilson Eddy, Gerald A. Stout, Oliver J. Worthington, E. M. Mrak.

Communications concerning Committee work, or the availability of individuals to serve as committeemen, should be addressed to the President, Dr. Paul F. Sharp, University of California, College of Agriculture, Giannini Hall, Berkeley 4, California.

President Sharp will announce additional committee appointments at a later date.

Regional Section News

STIRRINGS DOWN UNDER

A group of Australian members of the Institute held a meeting in Sydney on May 29th, preliminary to organizing an Australian Regional Section. Charles E. Norton, American Can Co., was elected provisional president of the group, and Victor M. Lewis, 25 Byron St., Coogee, N. S. W., was elected Secretary. Mr. Lewis reports considerable enthusiasm shown by those present. Tentative times and places were fixed for two further meetings, after which the group will formally apply for a Regional Section Charter. An Australian Section appears to be a certainty before the end of 1950.

HOW ARE YOU GOING TO PACK THEM IN?

At the Section Officers' Breakfast during the 1950 Annual IFT Conference in Chicago, it was brought out that some Sections are having difficulty in getting a good turn-out at their meetings. Some thought that programs should be highly technical and spread information about the latest research developments set forth by outstanding experts. Others were of the opinion that meetings should include inspection tours of plants, laboratories, etc., and that the program should be interesting but not necessarily highly technical, with local speakers discussing their own problems. Considerable success has been achieved by at least one section in tailoring their programs for interest rather than highly

(Continued on page 18)

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Membership

Write to nearest regional secretary, if within an area covered by a regional section, or to the Executive Secretary of the Institute, for an application form and information regarding qualifications and classifications.

Regional Section News

(Continued from page 17)

technical matters. Nothing was said about fan or bubble dancers.

NORTHERN CALIFORNIA SECTION

The Section met on June 15th at the New Tivoli in San Francisco, a dinner at 7:00 and the meeting at 8:15. Dr. Karl F. Meyer, Director of the Hooper Foundation for Medical Research and Professor of Experimental Pathology at the University of California Medical School in San Francisco spoke on "World Health." He showed colored pictures of his recent trip to New Zealand and Australia to attend the International Health Conference.

On July 15th an informal outing was held by the members of the Section, at Alum Rock Park, San Jose.

PUGET SOUND SECTION

The Section held its election of officers for 1950-51, by mail ballot. The following were elected for the coming year:

Chairman: James C. Palmer, Federal Food and Drug Administration, Seattle, Wash.

Vice-Chairman: John A. Ardussi, Carl F. Miller and Co., Seattle, Wash.

Secretary: F. Bruce Sanford, U. S. Fish and Wildlife Service, Seattle, Wash.

Treasurer: Joseph L. Bigas, American Can Co., Seattle, Wash.

National Councilor: Charles R. Stumbo, State College of Washington, Pullman, Wash.

Executive Committee: Ray W. Clough, National Canners Assn., Seattle; Clarence W. Hurlbut, Blue Banner Foods, Kent, Wash.; Francis P. Owens, Laucks Laboratories, Inc., Seattle; Max Patashnik, Libby, McNeill and Libby, Seattle.

The Section's activities will be suspended until late September or early October.

PERSONNEL

JAMES A. BERRY, SR. of the Bureau of Agricultural and Industrial Chemistry's Western Regional Research Laboratory at Albany, Calif., and a member of the Bureau's staff since 1929 when he was with H. C. "Dutch" Diehl at the Frozen Pack Laboratory in Seattle, has left to join the National Antiseptic Co., at Olympia, Washington. He contemplates opening a bacteriological laboratory for research and control in the East Bay Region at a later date.

J. STAFFORD ELLITHORP, JR., formerly Vice President of Beech-Nut Packing Co., has been elected president of that company. Another food technologist has achieved the top position in a food processing company.

JAMES W. EVANS, formerly head of the Foods Research Section of General Mills has become director of the research laboratories of American Maize-Products Co., Roby, Indiana.

RIDGWAY KENNEDY, JR., formerly production manager, Abbotts Dairies, Inc., Philadelphia, has been chosen president of that company. He has come up through the ranks through the production of ice cream,

and is well-known for his breadth of view in technical matters.

ROBERT W. KILBURN has resigned from Food Machinery and Chemical Corp., to become Director of Research of the Florida Citrus Canners Cooperative at Lake Wales. He will succeed J. L. Heid who resigned to become General Manager of Golden Citrus Products, Fullerton, California. Mr. Kilburn is a graduate of the University of California (1937). He spent nine years with Treesweet Products Co., at Santa Ana, California before going with Food Machinery, where he was canning research technologist and co-inventor of FMC's chemical steam peeler for fruit.

KARL F. MEYER, Director of the George Hooper Foundation for Medical Research, University of California Medical Center, has made the June, 1950 issue of *Readers' Digest*. We look next for his name in electric lights in a feature Technicolor movie: "Botulinum on the Bounce," or "Squirrels Harbor More Than Nuts."

CARL S. MINER, Director, Miner Laboratories, Chicago, will receive the 1950 Honor Scroll Award of the Chicago Chapter of the American Institute of Chemists "in recognition of his abilities as a chemist and for his long-time efforts in advancing the professional interests of chemists and particularly in awakening and guiding professional attitudes in younger chemists."

LUDVIG REIMERS, Manager, Products Control Dept., Sperry Division of General Mills, and Mrs. Reimers have returned from a vacation tour of the Hawaiian Islands. As tax payers, they saw part of their money go up in smoke when they viewed the crash of the Mars plane from the first whiff of smoke to the last fiery glory.

CLARENCE P. WILSON, Director, Products Department, California Fruit Growers Exchange, retired March 1st after 33 years of service to the California-Arizona citrus industry. Mr. Wilson started his scientific career in 1907 as a scientific assistant in the old Bureau of Chemistry, U. S. Department of Agriculture, coming to California in 1911 as assistant chemist in the Bureau's fruit and vegetable chemistry laboratory on Mission Road in Los Angeles. In 1916 he left the Government to become manager of the Exchange Lemon Products Co., and in 1920 he joined the staff of the California Fruit Growers Exchange as chemist in charge of the Research Department. He became assistant manager of the Products Department in 1929, and ten years later General Manager. In 1944 he became Director of Products Research for the Sunkist Marketing Cooperative. Mr. Wilson's pioneer work in the field of citrus by-products was instrumental in making the Exchange products plants the most complete of their kind in the world.

EVERETT WOLFORD, bacteriologist at the Bureau of Agricultural and Industrial Chemistry's Western Regional Research Laboratory at Albany, California, has been transferred to the Bureau's Pasadena, California, laboratory.

EMPLOYMENT NOTICES

Wanted, graduate chemist for technical service work on food starches. N. Y. City lab. $260-$325 mo. start depending upon experience. State age, education, experience. Box 102, Institute of Food Technologists, 176 Adams St., Chicago 3, Ill.

Wanted, Process Engineer, 27-33 Ch.E. or M.S. Some Food Technology. Experience quality control. Mature thinking, ability visualize plant operations, initiative, personality. Leading N. Y. C. firm. Submit complete resumé, salary. Address I. F. T., Rm. 1532-A, 176 W. Adams St., Chicago 3.

Wanted, College grad; strong Chemistry, English background; prefer experience experimental foods; research laboratory large midwest manufacturing firm; prefer someone living in this area; give full details. Reply Box 103, Institute of Food Technologists, 176 W. Adams St., Chicago 3, Ill.

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I. F. T. EMPLOYMENT SERVICE

In the interest of bringing together organizations seeking the services of food technologists, and food technologists seeking new positions, the Council of the Institute has established the service outlined below.

A. Organizations in the food and allied industries may run notices of positions open in food technology and no charge will be made for this service. Notices will appear over code numbers and replies will be forwarded promptly to the firm running the notice. In no case will the identity of the firm be revealed. To take advantage of this service simply write to the Executive Secretary of the Institute of Food Technologists, 176 W. Adams St., Chicago 3, Illinois, describing briefly the position that is open. Notices received before the 10th of any month will appear in the next issue of FOOD TECHNOLOGY, published on the 5th of the following month. Notices received after the 10th will appear one month later. All that is asked is that the firm or organization running the notice acknowledge to the applicant each application received. Should the position not be filled by one insertion the same notice will be repeated upon request.

B. Members of the Institute seeking new positions may run notices in FOOD TECHNOLOGY at $2.00 per issue. This is about one-fifth the regular space rate. Remittance to cover the cost must accompany the notice. Simply mail your notice with $2.00 to the Executive Secretary.

Notices of positions open or positions wanted will be limited in size to one column inch—approximately 30 words.

Members are requested to bring this service to the attention of personnel directors of their organization.

STABILIZATION AND ANTIOXIDANTS

Article by H. T. Spannuth, published in the *Journal of the American Oil Chemists' Society* 26, 10, 618 (1949).
Abstracted by Martin Heerdt.

Hydrolytic rancidity is usually associated with butter fat. The odor is attributed to volatile acids, such as butyric, caproic, and caprylic which are liberated through the enzymatic action of lipase. *Ketonic rancidity* has been associated with fats containing C_5 to C_{14} normal saturated acids which are converted to methyl ketone of one less carbon atom. Biological degradation of fatty acids is considered to proceed by beta oxidation to the keto acid, which is then split by hydrolysis to yield an acid with two less carbon atoms; but when the enzymatic activity is impaired, the oxidative process tends to stop short at the beta keto acid. This acid then loses carbon dioxide readily by the action of carboxylase and is thus converted into the corresponding methyl ketone. This type of spoilage has been reported as taking place in anaerobic conditions although the first step is an oxidative one. The ketonic oxidative rancidity is associated usually with mold growth.

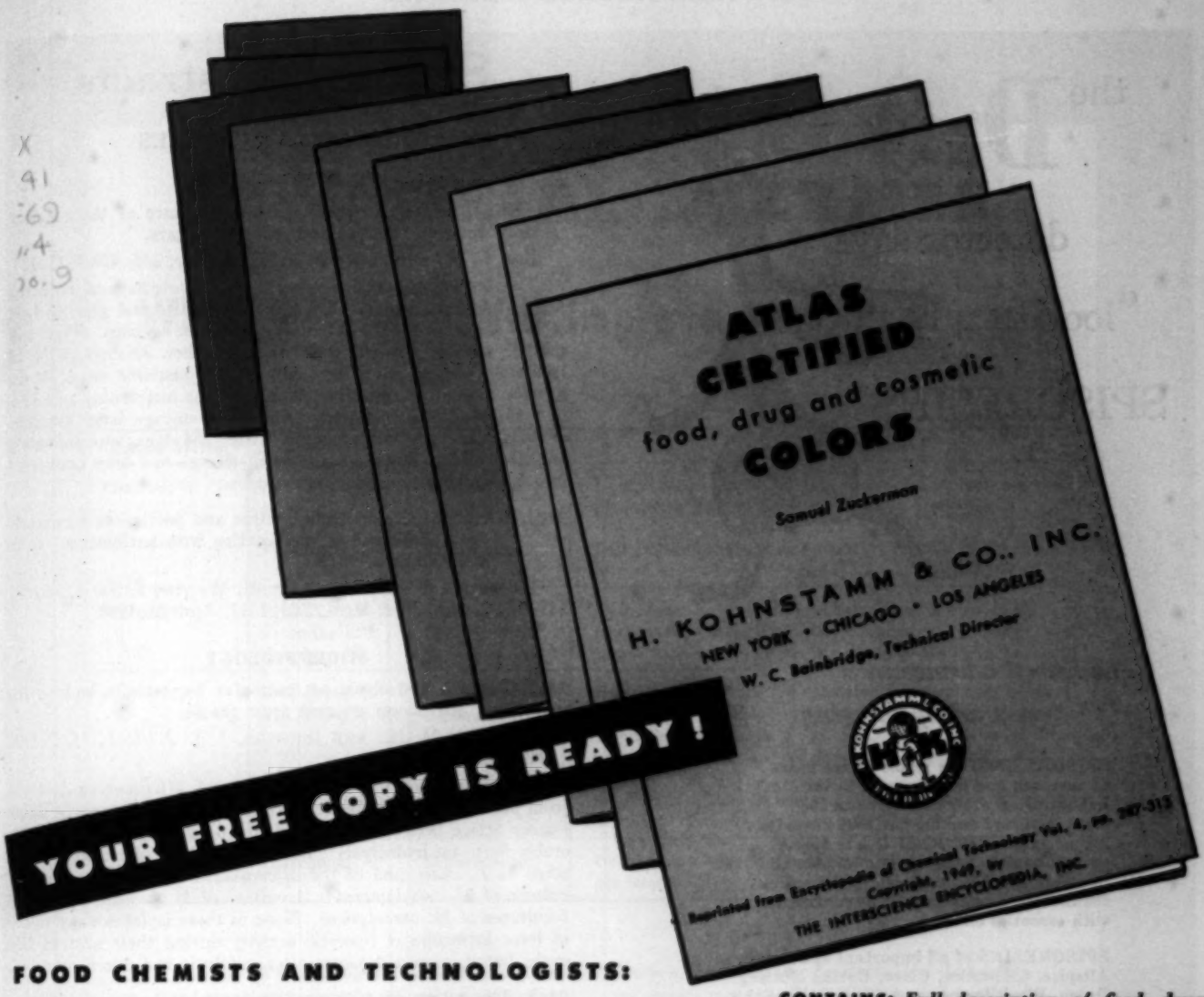
Several characteristics have been used in an attempt to describe *auto-catalytic rancidity;* however, the hydro-peroxidic rancidity perhaps is the best. In decomposition of the hydroperoxide, active oxygen is produced which is associated with the auto-catalytic characteristic. It has been referred to as "ethylenic" rancidity due to the active oxygen attacking the ethylenic bond at the time the peroxide decomposes with the development of scission compounds which are directly responsible for the rancid odor and flavor. The predominance of aldehydes is characteristic of this type of rancidity and has given rise to its reference as "aldehydic" rancidity.

The term "reversion" is a misnomer because the objectionable flavor and odor is not characteristically normal to the *fresh* fat. The evidence is growing that the phenomenon is one of extremely limited oxidation involving linolenic acid. It seems that minute quantities of oxygen of molecular or intramolecular origin, under certain conditions of light, heat, and metal catalysts, can easily oxidize a component, such as linolenic acid, so as to give scission products associated with the decomposition of peroxides without accumulation of appreciable peroxides. There is suggestive evidence that auto-catalytic oxidation and reversion are similar and differ in degree.

Oil chemists find the *free fatty acid* a useful test but realize it is only associated with oxidative rancidity which has passed to an advanced stage resulting from chain scission. It is valuable as a simple test to reflect past treatment of fat-bearing tissue such as beef or pork tissue or oil seeds. It should be pointed out that tests for aldehydes represent transitory compounds of a late stage which, for the greater part, are oxidized to acids, reduced to alcohols, or polymerized. Tests are available for measuring the short (Issolio), intermediate (Lea), and long chain aldehydes (Schibsted).

Peroxide value. The formation of hydroperoxide has been shown to be common to air oxidation when promoted by metals, heat below 120° C., light or lipoxidase. Being the first step, it is not responsible for the rancid flavor but is a precursor. It has been extremely valuable in the development of the art of stabilization, being fully informative when applied to fresh fats and best when presented in a series following an accelerated oxidation test. *Active Oxygen Method* (AOM) or Swift test. This test is restricted to fats and oils which are practically free of non-fatty materials. By plotting the peroxide value against time of the test in hours, a curve is secured demonstrating the induction period and the auto-catalytic effect. The AOM value means, under the conditions of the test, that the keeping quality is so many hours. *The incubation test at 140° F.,* or Schaal test, is not well standardized. Its advantage is simplicity and the fact that fatty material can be tested, such as crackers, potato chips, cookies, prepared mixes, effects of papers and cardboards on fat, etc. It can be used in conjunction with the peroxide value, as is also the AOM.

The following factors affecting rancidity are discussed in turn: oxygen; composition and fatty acid configuration; temperature; light; chemical pro-oxidants—metals, and rancid fat; antioxidants; synergists; and moisture. Eighteen general references are provided.—*Commercial Fisheries Abstracts,* April, 1950.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Selected Abstracts

BIOLOGICAL SCIENCES

BIOCHEMISTRY

251J. Biochemical and nutritional significance of the reaction between proteins and reducing sugars.

LEA, C. H., AND HANNAN, R. S. *Nature, 165,* 438-9 (1950).

The browning reaction occurs when proteins and reducing sugars are heated together. Sodium caseinate and glucose held at 37° C. at 70% R. H., and free amino groups of protein reacted with glucose in ratio of 1-1. After 30 days, 90% of lysine, 40% of arginine, and 30% of the histidine were shown to have reacted. Approximately 50% of the methionine and 33% of tyrosine also disappeared. On further storage large amounts of dialyzable materials appeared. After 164 days, approximately one-third of the glucose undergoing change had been converted into dialyzable decomposition products.

252J. Effects of uronic acids, pectins and pectinates on enteric flora, alone and in combination with antibiotics. I. In vitro studies.

WOOLDRIGE, W. E., AND MAST, G. W. *Am. J. Surg., 78,* 881 (1949); *J. Am. Med. Assn., 142,* 1317, Apr. 22, 1950.

MICROBIOLOGY

253J. Delayed hydrolysis of butterfat by certain lactobacilli and micrococci isolated from cheese.

PETERSON, M. H., AND JOHNSON, J. J. *J. Bact., 58,* 701-08 (1949).

Several cultures of *Lactobacillus and Micrococcus* isolated from normal Cheddar cheese were found to possess intracellular lipases active between pH 5 and pH 6 and capable of considerable butterfat hydrolysis. The *Lactobacillus* isolates were identified as *L. casei,* and of the *Micrococcus* isolates there was 1 culture of *M. conglomeratus,* 1 culture of *M. freudenreichii* and 2 cultures of *M. caseolyticus.* None of these isolates were found to have intracellular lipolytic activity during their normal life cycle, but it seemed to occur after autolysis had taken place.

254J. The action of cationic detergents on bacteria and bacterial enzymes.

KNOX, W. E., AUERBACH, V. H., ZARUDNAYA, K., AND SPIRTES, M. *J. Bact., 58,* 443-52 (1949).

Several cationic detergents have been shown to produce effects of killing and inhibition proportional to the detergent-bacterial ratio, and not to the detergent concentration. Specific inhibition of detergent-sensitive enzymes was also described which might account for the metabolic inhibition, cell death, and increased permeability observed in bacteria with bactericidal amounts of cationic detergents.

NUTRITION

255J. Some interrelationships of copper, molybdenum, zinc and lead in the nutrition of the rat.

GRAY, L. F., AND ELLIS, G. H. *J. Nutr., 40,* 441-52 (1950).

The demonstration of various relationships such as those between copper and zinc, and molybdenum and zinc, and probably molybdenum and copper, emphasize the necessity for a consideration of the levels of all minerals in the diet before determining the requirements for any one. This type of study reaffirms the observation that a deficiency disease may not reflect merely a low level of dietary essential, but an excess of one or more other nutrients which interfere with the normal metabolism of that essential dietary constituent.

256J. Effect of sulphite in dehydrated foods on thiamine content of a diet.

THOMAS, M. H., AND BERRYMAN, G. H. *J. Am. Diet. Assn., 25,* 941-2 (1949).

(Continued on page 4)

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	Pectinesterase	Experimental	Demethoxylates pectin without hydrolysis of the galacturonic acid chain. pH range 3.5 - 5.
Proteolytic	RHOZYME P-11 Protease 15 Protease 16	Commercial Experimental Experimental	Hydrolyze proteins to peptides and amino acids. pH ranges 5.5 - 8.5. (Relative amounts of peptides and amino acids will differ for each proteolytic enzyme.)
Amylolytic	RHOZYME S RHOZYME T-22	Commercial Commercial	Hydrolysis of starch to dextrins, maltose and glucose. Contain both an alpha amylase and a strong glucogenic principle. pH range 5 - 6. RHOZYME S is a purified enzyme; RHOZYME T-22 the crude product.
	RHOZYME DX	Commercial	Hydrolysis of starch to dextrins. Heat stable. pH range 5.5 - 6.5.
Lactase	Lactase A	Experimental	Hydrolysis of lactose to glucose and galactose. pH range 6.1 - 7.5.

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